Ah? It's Not Yesterday Once More?

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

This is an interactive problem.

There is a kangaroo located at the integer s between l and r (both inclusive) on the number line, and your task is to find s with at most 3 queries.

Each query consists of an integer x. The interactor will output $|s - x|$ as the answer to your query.

Note that the interactor is not adaptive, meaning that the answer for each test case is pre-determined.

Input

There are multiple test cases. The first line of the input contains an integer T ($1 \leq T \leq 100$) indicating the number of test cases. For each test case:

The first line contains two integers l and r ($1 \leq l \leq r \leq 10^9$).

Interaction Protocol

To ask a query, output one line. First output `?` followed by a space, then print an integer x ($1 \leq x \leq 10^9$). After flushing your output, your program should read a single integer indicating the answer to your query.

If you want to guess the special integer, output one line. First output `!` followed by a space, then print an integer s ($l \leq s \leq r$) indicating the special integer. After flushing your output, your program should continue processing the next test case, or exit immediately if there are no more test cases. Note that your guess does not count as a query.

To flush your output, you can use:

- `fflush(stdout)` (if you use `printf`) or `cout.flush()` (if you use `cout`) in C and C++.
- `System.out.flush()` in Java.
- `stdout.flush()` in Python.

Example

standard input	standard output
2 20 25 2 1 0 100 200 160	 ? 20 ? 21 ? 22 ! 22 ? 300 ! 140